Kenyan Radio Astronomy School

Unit 4

Joe Callingham (ASTRON)
& Willice Obonyo
(University of Leeds)

The Technical University of Kenya,
Nairobi, Kenya
28th of May 2018

DARA
DEVELOPMENT IN AFRICA WITH RADIO ASTRONOMY

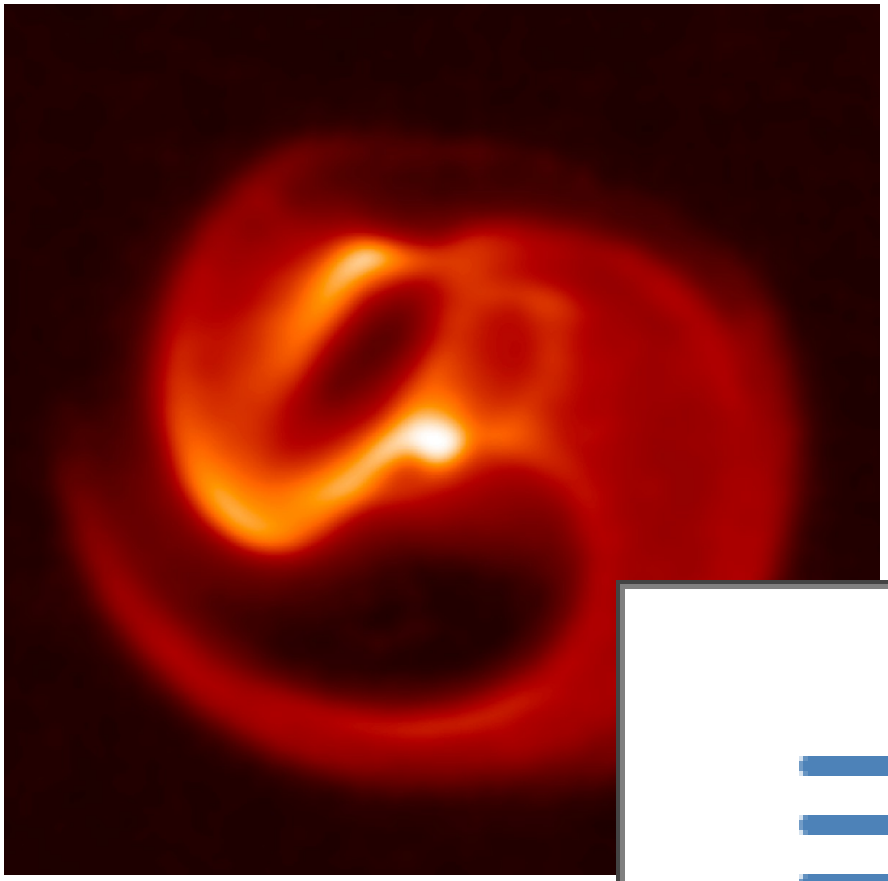
UNIVERSITY OF LEEDS

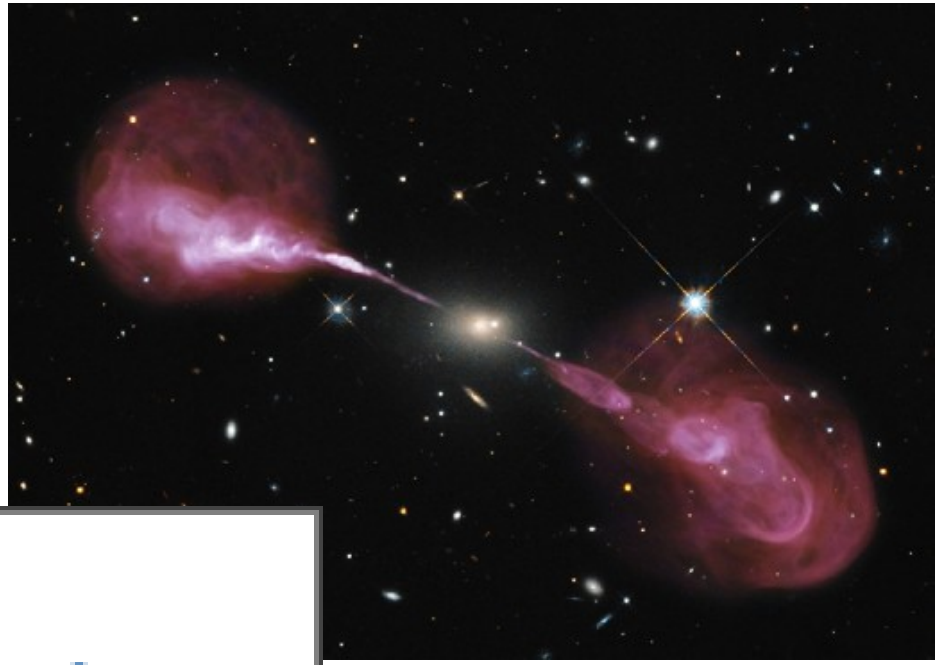
The Lecturers (aka your friends) – Dr. Joe Callingham

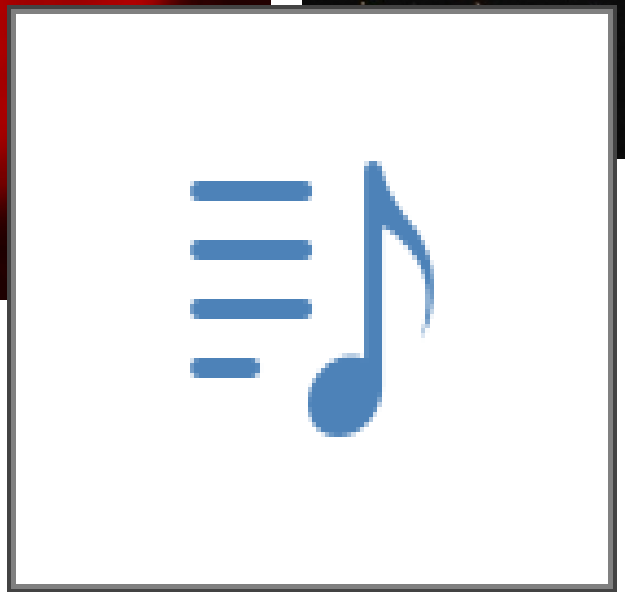
- ASTRON (Netherlands Institute of Radio Astronomy) Postdoctoral Fellow
- Born and raised on the East Coast of Australia. If my accent is a problem, please let me know!
- Bachelor of Science (Advanced) Honours Class 1 at the University of Sydney
- PhD at the University of Sydney working with Prof. Bryan Gaensler (UToronto) and Prof. Ron Ekers (CSIRO)

The Lecturers (aka your friends) – Dr. Joe Callingham

ASTRON



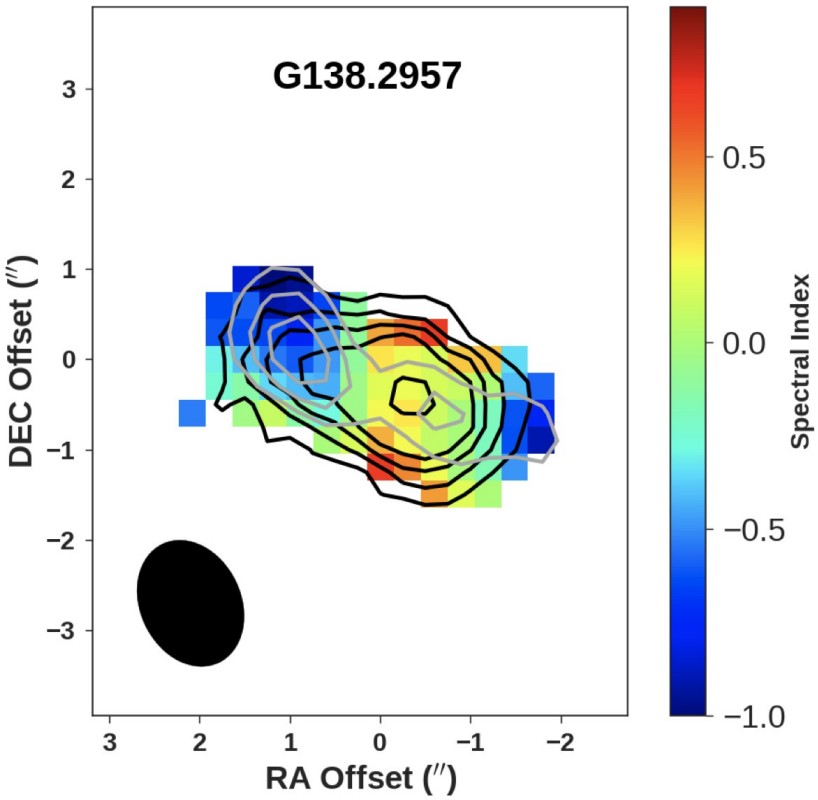




The Lecturers (aka your friends) – Willice Obonyo

- **Born in Migori County, Kenya in 1981**
- 1988-1996: Primary school in Uriri sub county
- 1988-1996: Secondary school in Bondo sub county (Barkanyango secondary school)
- 2002-2006: Bachelor of Education (science) – physics and Mathematics – Moi University, Eldoret.
- 2007-2012: Teacher at Rapogi High school
- 2008-2009: Masters in Physics – Moi University, Eldoret (Part time) - Research on Theoretical nuclear physics

The Lecturers (aka your friends) – Willice Obonyo



› 2013-2014: MSc (Astrophysics and space science), University of Cape Town funded by SKA bursary.

- Topic: Spectroscopic and Photometric study of open star cluster –Trumpler 27
-Data used: optical spectra from 1.9m telescope.

› 2016-2018– PhD (Astronomy) – University of Leeds funded by Newton Fund.

- Topic: Properties of Jets from massive young stellar objects.
- Data used: VLA data at 1.5 GHz
- Numerical simulation of thermal MYSO jets

Goals of this school - broad

- Improve your understanding of the basics of radio interferometry
- Become familiar with the data produced by modern radio interferometers, in particular the EVN
- Introduction to calibration and imaging strategies such as continuum imaging, self-calibration, flagging, spectral lines, error recognition etc
- Be able to produce science ready products
- Familarity with common astronomy tools, such as UNIX, Python, DS9, CASA
- Have fun!

Jam-packed Agenda – Week 1

Date	Block	Title	Type	Tutor
28-May	Morning	Introductory Talk	Lecture	Joe and Willice
28-May	Morning	Get to know you excercises and checking equipment	Hands on	Everyone
28-May	Morning	Revision of the basics of radio interferometry	Lecture	Joe
28-May	Afternoon	Introduction/Revision of Linux and Python	Lecture and Hands on	Joe and Willice
28-May	Afternoon	Fun with Fourier Transforms and Pyinterferometer	Lecture and Hands on	Willice
29-May	Morning	Modern Interferometers	Lecture	Joe
29-May	Morning	Introduction to EVN data for reduction	Lecture	Joe
29-May	Morning	CASA_basic_EVN N14c3 data inspection	Hands on	Willice and Joe
29-May	Afternoon	Introduction to Calibration	Lecture	Joe
29-May	Afternoon	CASA_Basic_EVN N14c3 data calibration	Hands on	Willice and Joe
30-May	Morning	Advanced Calibration	Lecture	Joe
30-May	Morning	CASA_Basic_EVN N14c3 data calibration part 1	Hands on	Willice and Joe
30-May	Afternoon	CASA_Basic_EVN N14c3 data calibration part 2	Hands on	Willice and Joe
30-May	Afternoon	Introduction to Imaging	Lecture	Joe
30-May	Afternoon	CASA_1848+283_J1849+3024 N14c3 Imaging part 1	Hands on	Willce and Joe
31-May	Morning	Choosing the "best" calibration values	Lecture	Joe
31-May	Morning	CASA_1848+283_J1849+3024 N14c3 Imaging part 2	Hands on	Willce and Joe
31-May	Afternoon	Self-Calibration	Lecture	Joe
31-May	Afternoon	CASA_1848+283_J1849+3024 N14c3 Self Cal and Imaging	Hands on	Willice and Joe
1-Jun	Morning	Flagging	Lecture	Willice
1-Jun	Morning	CASA_J1640+3946_3C345 N14c3 data reduction	Hands on	Willice and Joe
1-Jun	Afternoon	CASA_J1640+3946_3C345 N14c3 data reduction	Hands on	Willice and Joe
1-Jun	Afternoon	First science talk on Radio Active Galactic Nuclei	Lecture	Joe

- Roughly one lecture in the morning and afternoon, with a couple of hours with hands on data reduction in between

The benefits from this experience

- Hands on experience with data similar to what will be produced by the AVN
- Experience with reducing data to a quality that you can produce scientific data
- Gain knowledge of what makes a compelling telescope proposal
- Programming experience that is applicable outside of astronomy too
- Signal processing vital to electronic engineering and hardware production
- SKA jobs coming up

Lets do this!